

EXHIBIT C

User Manual

GDC 060R128-000-01
Issue 1 - December 1998

Technical Reference Guide

Quester™ III

 General DataComm

Antistatic Precautions

Electrostatic discharge (ESD) results from the buildup of static electricity and can cause computer components to fail. Electrostatic discharge occurs when a person whose body contains a static buildup touches a computer component.

The equipment may contain static-sensitive devices that are easily damaged and proper handling and grounding is essential. Use ESD precautionary measures when installing parts or cards and keep the parts and cards in antistatic packaging when not in use. If possible, use antistatic floorpads and workbench pads.

When handling components, or when setting switch options, always use an antistatic wrist strap connected to a grounded equipment frame or chassis. *If a wrist strap is not available, periodically touch an unpainted metal surface on the equipment.* Never use a conductive tool, like a screwdriver or a paper clip, to set switches.

Safety Guidelines

The following symbols are used when unsafe conditions exist or when potentially hazardous voltages are present:



Warning statements identify conditions or practices that can result in personal injury or loss of life.



Caution statements identify conditions or practices that can cause damage to the equipment or loss of data.

Always use caution and common sense. *To reduce the risk of electrical shock, do not operate equipment with the cover removed.* Repairs must be performed by qualified service personnel only.

- Never install telephone jacks in a wet location unless the jack is designed for that location.
- Never touch uninsulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Use caution when installing telephone lines and never install telephone wiring during an electrical storm.

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Regulatory Notices

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursuant to FCC Part 15, which is designed to provide reasonable protection against such interference when operated in a residential environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. The user is cautioned that any changes or modifications not expressly approved by General DataComm void the user's authority to operate the equipment.

FCC Part 68 Compliance

Connection of data communications equipment to the public telephone network is regulated by FCC Rules and Regulations. This equipment complies with Part 68 of these regulations which require all of the following: All connections to the telephone network must be made using standard plugs and telephone company - provided jacks or equivalent. Connection of this equipment to party lines and coin telephones is prohibited. A label on the underside of the equipment provides the FCC Registration number and the Ringer Equivalence Number (REN) for the unit. If requested, give this information to the telephone company.

If the unit causes harm to the telephone network, the telephone company may discontinue your service temporarily and if possible, you will be notified in advance. If advance notice is not practical, you will be notified as soon as possible and will be advised of your right to file a complaint with the FCC. The telephone company may change its communication facilities, equipment, operations and procedures where reasonably required for operation. If so, the telephone company will notify you in writing. All repairs or modifications to the equipment must be performed by General DataComm. Any other repair or modification by a user voids the FCC registration and the warranty.

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via telephone fax machine unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual.

In order to ensure that this information is included in your fax transmission you must follow the instructions in your fax driver software for generating fax cover pages (i.e., in Quick Link II, select "Cover Page Setup" under "Setup" and fill in the requested information. You must then select to send the cover page with your transmissions by selecting "Setup", then "Send Fax Setup", and in the control options menu, set "Include Cover Page").

Canada DOC Notification

The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also

be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas. *Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.*

NOTICE: *The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the sum of the Load Numbers of all the devices does not exceed 100.*

This digital apparatus does not exceed Class B limits for radio noise emissions from digital apparatus described in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Service and Support

General DataComm is committed to providing the service and support needed to install, manage and maintain your equipment. For information about service programs or for assistance with your Quester II modem, call General DataComm Service (GDCS) at the 24-hour number, listed below.

- in the U.S. dial 1-800-243-1030
- outside the U.S. dial 1-203-598-7526

Provide the dispatcher with the site name and phone number and a description of the problem and the next available support representative will promptly return your call.

Hands-on training courses are provided by GDCS Educational Services. Courses range from basic data communications, modems and multiplexers, to complex network and ATM systems and are taught in Connecticut or at a customer location. Call 1-800-242-1030 and follow the menu instructions to discuss educational services or to receive a courses schedule.

Warranty

General DataComm warrants that its equipment is free from defects in materials and workmanship. The warranty period is five years from the date of shipment. GDC's sole obligation under its warranty is limited to the repair or replacement of the defective equipment provided it is returned to GDC, transportation prepaid, within a reasonable period. This warranty will not extend to equipment subjected to accident, misuse, or alterations or repair not made by GDC or authorized by GDC in writing. *The foregoing warranty is exclusive and in lieu of all other warranties, express or implied, including but not limited to, warranties of merchantability and fitness for purposes.*

QuesterTM II

V.90 Data / Fax PC External Modem

The compact and value packed Quester III from General DataComm (GDC) complies with the latest standards-based V.90 and V.34 technology. It offers both the highest speed and full interoperability with other V.90 modems. In addition to V.90 and V.34 standards, Quester III is compliant with existing dial-up standards. Quester III connects at the fastest possible line rate and continuously checks to ensure that the selected rate is valid. No more drop-outs or disconnects. Quester III automatically makes the connection... and stays connected.

In V.34 mode the Quester III provides fast and efficient protection from unauthorized callers with GDC's patented Steadfast Security. A second level of protection is also available with the callback security mode. Callback security can also save in connect charges by concentrating telephone billing in one location.

Using state of the art VLSI technology and custom chip design, Quester III shatters the limits on throughput. With V.42 bis compression, file transfers are faster, you can be more productive, and you save more money on connect times. In fact, your savings could well pay for Quester III within the first year!

Quester III supports facsimile transmission (FAX) at all speeds up to 14.4 kbps (V.17).

Whether you want to surf the Internet, connect to your favorite bulletin board, e-mail a colleague, or FAX a friend, Quester III makes it all simple to do.

Proven in the lab as well as in the office, Quester III is designed for your connections.

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INFORMATION TO THE USER

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device. Pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception. Which can be determined by turning the equipment off and on the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This booklet is available from the US government Printing Office
*Washington, DC 20402, Stock NO. 004-000-00345-4.

CAUTION: Any changes of modifications not expressly approved by the grantee of this device could void the users authority to operate the equipment.

The shielded RS-232 cable are to be used in order to ensure compliance with FCC Part 15, and it is the responsibility of the user to provide and use shielded RS-232 cable from modem to personal computer.

1 System Description

The GDC Quester III modem is a multi-speed switched network modem providing 56 kbps to 300 bps asynchronous operation. It has integral error correction and data compression capabilities, and provides compatibility with the most popular switched network modems. The Quester III provides automatic dialing and configuration using the AT (ATtention) command set.

Features

- 2-wire, full-duplex, switched network operation.
- Manual or automatic answer.
- Flash ROM for easy upgrading via download.
- Audible Call Progress.
- Asynchronous DTE rates to 230.4 kbps.
- Automatic rate negotiation in auto modes.
- Data compression.
- Memory for permanent storage of modem configurations, phone numbers, and passwords.
- Asynchronous character lengths of 8, 9, 10, and 11 bits.
- AT command set for configuration and dialing.
- Text Help screens for AT command status display.
- Stores up to ten telephone numbers for easy dialing.
- Pulse or tone dialing.
- Tests through the Extended &Tn commands.
- Supports FAX Class 1 operations at 2400, 4800, 9600, or 14,400 bps.

With GDC modems at both ends:

- SteadFast Security[®] in V.34 mode.
- Security callback.

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Equipment

When unpacking the box, check that all components are included.

Each box includes:

- Quester III V.90 Modem
- Technical Reference Guide
- Phone line cable
- Power supply
- 25-pin to 25-pin / 9-pin terminal cable

NOTE: All the special accessories provided by the party responsible for the equipment (GDC), such as the terminal cable and the power supply are required to enable the Quester III modem to comply with the emission limits of FCC Part 15. These special accessories must be used with the Quester III modem.

It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Table 1-1 Technical Characteristics

Item	Specification
VF Data Rate	
56 kbps (ITU-T V.90)	Asynchronous
54.666 kbps (ITU-T V.90)	Asynchronous
53.333 kbps (ITU-T V.90)	Asynchronous
52 kbps (ITU-T V.90)	Asynchronous
50.666 kbps (ITU-T V.90)	Asynchronous
49.333 kbps (ITU-T V.90)	Asynchronous
48 kbps (ITU-T V.90)	Asynchronous
46.666 kbps (ITU-T V.90)	Asynchronous
45.333 kbps (ITU-T V.90)	Asynchronous
44 kbps (ITU-T V.90)	Asynchronous
42.666 kbps (ITU-T V.90)	Asynchronous
41.333 kbps (ITU-T V.90)	Asynchronous
40 kbps (ITU-T V.90)	Asynchronous
38.666 kbps (ITU-T V.90)	Asynchronous
37.333 kbps (ITU-T V.90)	Asynchronous
36 kbps (ITU-T V.90)	Asynchronous
34.666 kbps (ITU-T V.90)	Asynchronous
33.333 kbps (ITU-T V.90)	Asynchronous
32 kbps (ITU-T V.90)	Asynchronous
30.666 kbps (ITU-T V.90)	Asynchronous
29.333 kbps (ITU-T V.90)	Asynchronous
28 kbps (ITU-T V.90)	Asynchronous
33.6 kbps (ITU-T V.34)	Asynchronous
31.2 kbps (ITU-T V.34)	Asynchronous
28.8 kbps (ITU-T V.34)	Asynchronous
26.4 kbps (ITU-T V.34)	Asynchronous

Table 1-1 Technical Characteristics (Cont.)

Item	Specification
VF Data Rate (Cont.) 24.0 kbps (ITU-T V.34) 21.6 kbps (ITU-T V.34) 19.2 kbps (ITU-T V.34) 16.8 kbps (ITU-T V.34) 14.4 kbps (ITU-T V.34 or ITU-T V.32 <i>bis</i>) 12.0 kbps (ITU-T V.34 or ITU-T V.32 <i>bis</i>) 9600 bps (ITU-T V.34 or ITU-T V.32) 7200 bps (ITU-T V.34 or ITU-T V.32 <i>bis</i>) 4800 bps (ITU-T V.34 or ITU-T V.32) 2400 bps (ITU-T V.34 or ITU-T V.22 <i>bis</i>) 1200 bps (ITU-T V.22 or Bell 212A) 300 bps (ITU-T V.21) 300 bps (Bell 103)	Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous Asynchronous
Data Format Bit asynchronous	Selectable 8, 9, 10, or 11 bits per character
Compatibility	ITU-T V.90, V.34, V.32 <i>bis</i> , V.32, V.22 <i>bis</i> , V.22, V.21, Bell 212A, and Bell 103
Operating Mode Switched network	Two-wire full duplex

Table 1-1 Technical Characteristics (Cont.)

Item	Specification								
Modulation 28 to 56 kbps 2.4 to 33.6 kbps 14.4 kbps 12.0 kbps 9600 bps 9600 bps 7200 bps 4800 bps 2400 bps 1200 bps 0-300 bps	V.90 As specified by ITU-T V.34 As specified by ITU-T 128-level TCM/2400 Baud $\pm 0.01\%$ 64-level TCM/2400 Baud $\pm 0.01\%$ 32-level TCM/2400 Baud $\pm 0.01\%$ 16-level QAM/2400 Baud $\pm 0.01\%$ 16-level TCM/2400 Baud $\pm 0.01\%$ 4-level QAM/2400 Baud $\pm 0.01\%$ 16-level QAM/600 Baud $\pm 0.01\%$ 4-level PSK/600 Baud $\pm 0.01\%$ FSK 0-300 Baud $\pm 0.01\%$								
Answer Tone ITU-T V.32 <i>bis</i> , V.32, V.22 <i>bis</i> , V.22 and V.21 modes Bell 212A and 103 modes	2100 Hz ± 3 Hz 2225 Hz ± 3 H								
Transmit Carrier V.90 and V.34 ITU-T V.32 <i>bis</i> ITU-T V.32 ITU-T V.22, V.22 <i>bis</i> /Bell 212A Originate Mode Answer Mode ITU-T V.21 Originate Mode Answer Mode	As specified by ITU-T 1800 Hz $\pm 0.01\%$ 1800 Hz $\pm 0.01\%$ 1200 Hz ± 0.5 Hz 2400 Hz ± 1 Hz <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">Mark</td> <td style="width: 50%; text-align: center;">Space</td> </tr> <tr> <td style="text-align: center;">1180 Hz ± 12 Hz</td> <td style="text-align: center;">980 Hz ± 12 Hz</td> </tr> <tr> <td style="width: 50%; text-align: center;">Mark</td> <td style="width: 50%; text-align: center;">Space</td> </tr> <tr> <td style="text-align: center;">1850 ± 12 Hz</td> <td style="text-align: center;">1650 ± 12 Hz</td> </tr> </table>	Mark	Space	1180 Hz ± 12 Hz	980 Hz ± 12 Hz	Mark	Space	1850 ± 12 Hz	1650 ± 12 Hz
Mark	Space								
1180 Hz ± 12 Hz	980 Hz ± 12 Hz								
Mark	Space								
1850 ± 12 Hz	1650 ± 12 Hz								

Table 1-1 Technical Characteristics (Cont.)

Item	Specification
Transmit Carrier (Cont.)	
Bell 103	
Originate Mode	Mark Space 1270 Hz \pm 12 Hz 1070 \pm 12 Hz
Answer Mode	Mark Space 2225 Hz \pm 12 Hz 2025 \pm 12 Hz
Output Level	
Permissive - Switched network	-9 dBm maximum
Receive Carrier	
ITU-T V.90	As specified by ITU-T
ITU-T V.34	As specified by ITU-T
ITU-T V.32 <i>bis</i>	1800 Hz \pm 7 Hz
ITU-T V.32	1800 Hz \pm 7 Hz
ITU-T V.22 <i>bis</i> /Bell 212A	
Originate Mode	2400 Hz \pm 7 Hz
Answer Mode	1200 Hz \pm 7 Hz
ITU-T V.21	
Originate Mode	Mark Space 1850 Hz \pm 12 Hz 1650 \pm 12 Hz
Answer Mode	Mark Space 1850 Hz \pm 12 Hz 1650 \pm 12 Hz
Bell 103	
Originate Mode	Mark Space 2225 Hz \pm 12 Hz 2025 \pm 12 Hz
Answer Mode	Mark Space 1270 Hz \pm 12 Hz 1070 \pm 12 Hz

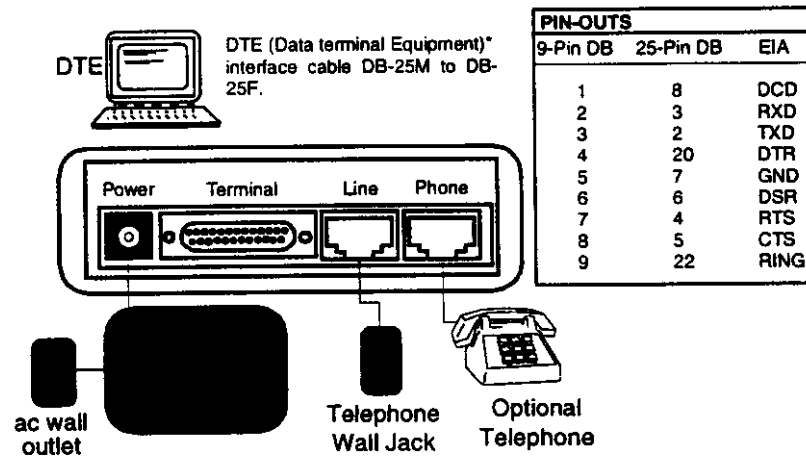
Table 1-1 Technical Characteristics (Cont.)

Item	Specification
Carrier Detect (Level for ITU-T V.22 <i>bis</i> , V.22, V.21, 212, 103) in Switched Network	Acquisition Release -43 dBm -48 dBm
Hysteresis	2 dBm minimum
NOTE: ITU-T V.90, V.34, V.32/V.32 <i>bis</i> /V.34 are echo canceling protocols that use signal quality as criteria for maintaining connection. They also provide for self-training detection to force disconnect.	
DTE Interface	EIA/TIA-232-E (ITU-T V.24/V.28/ISO 2110)
Line Connection	
Switched Network	6-position modular jack (US RJ11)
Phone	6-position modular jack (US RJ11)
Line Equalization	Automatic Adaptive
Connection Options	Loss of Carrier in ITU-T V.22 <i>bis</i> and lower.
Phone Types	500 (rotary dial), 2500 (DTMF dial)
Dialing	Pulse and Tone
DTMF Output Level	Per Part 68
Ringer Equivalent	0.6B
Pulse Dial Ratio	Make/Break: 39/61%
Ring Cadence	On 2 seconds; Off 4 seconds
DC Loop Current	20-80 milliamps

Table 1-1 Technical Characteristics (Cont.)

Item	Specification
Call Progress Monitor	BUSY CONNECT (rate) (see ITU-T V.42 options for delay) CONNECT (see ITU-T V.42 options for delay) NO ANSWER NO Carrier NO DIALTONE OK (character abort) RING RINGING UNOBTAINABLE NUMBER
Power Requirements	
Voltage	99 to 129 V ac
Frequency	50 to 60 Hz
Dissipation	8 W ac maximum (line cord)
Temperature	
Operating	0 to 40°C (32° to 104°F)
Non-operating	-40 to 70°C (-40° to 158°F)
Humidity, operating	Up to 95 % humidity (non-condensing)
Altitude, operating	0 m to 3,047 m (0 to 10,000 ft)

2 Installation



1. Turn Off the modem and the equipment connected to it.
2. Connect the modem as shown. (See the Quick Start Guide for a more detailed procedure).
3. Turn On the modem and the equipment.

* Macintosh users - use a standard Mac hardware-controlled modem shielded cable (not included). If you are using a Mac Hayes Compatible cable, you must choose Xon/Xoff flow control for the software selection and add the `\Q1` command to the software modem initialization string. To access the Internet, call the phone number found on ON-Line services Windows diskettes and request software for the Mac computer.

Figure 2-1 Rear Panel



3 Operation

Controls and Indicators

Figure 3-1 illustrates and describes the front panel of the unit

LEDs	ON	OFF
CS	Modem has turned On DTE interface signal, indicating it is ready to transmit data.	Modem is not ready to transmit data.
RS	DTE has turned On interface signal, indicating it is ready to receive data transmission.	Indicates modem is not ready to receive if \Q3 option is selected.*
CD	Carrier On lights when the modem receives acceptable carrier signal level, or when EIA carrier is forced On by the &C0 command.	Carrier is off.
OH	The modem is off-hook.	The modem is on-hook.
RD	Indicates received data.	Indicates no data received.
SD	Indicates data is the transmitted data.	No data received.
TR	DTE has turned On interface signal, indicating it is ready for data communications.	DTR is off.*
MR	Indicates modem is ready to operate.	Indicates modem is not ready to operate.
*Note	Forcing an option will not turn on the indicator - only the real signal state will be displayed on the LEDs.	

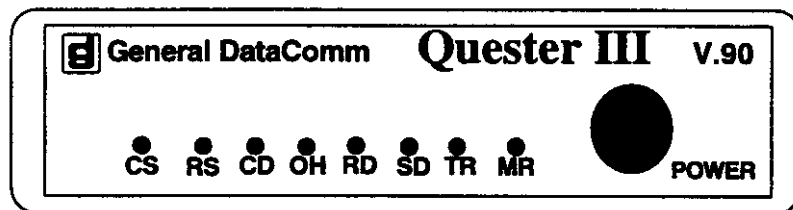


Figure 3-1 Front Panel

Communications Software

To operate a Quester III modem, you need to have a computer or a terminal (called the DTE) with an EIA/TIA-232-E serial port. This port enables communication between the DTE and the modem. If a computer is being used as the DTE, it will also require a communications software package. If you plan on using error correction or data compression, the software package must support flow control.

Software Selection

There are two types of modem software: data communications software and terminal emulation software. Terminal emulation software allows you to type at the keyboard and see responses on the video display or printer. Often these programs are used to communicate with mainframe or mini-computers and will not support disk management or file transfers. Essentially this type of software will "downgrade" your computer to a dumb terminal.

A full-featured communications software package will not only allow file transfers, but will also provide a dial directory, a script language for automated sessions, and a host of other features. Of course, the more powerful and flexible the software package, the more difficult it may be to master.

To take full advantage of the features of the Quester III modem, your selected program should allow turning off the auto baud feature. You should also be able to toggle both XON/XOFF and hardware flow control. In addition, it should support several file transfer protocols designed to be used with an error-correcting modem.

Although your modem will work with most standard communications programs and file protocols such as XMODEM, there may be a throughput penalty when using a software error-detecting protocol due to the redundant error-checking overhead. File transfer protocols that are recommended for use with error-correcting modems are YMODEM-G and ZMODEM.

FAX

The modem can support FAX Class 1 transmissions and can be used with fax software programs that support Class 1 fax commands. The Quester III fax is compatible with all Group 3 fax machines, running at 2400, 9600, 9800, and 14,4000 bps.

Setting Up Data Communications and Fax Software

Factory defaults (AT&F) are adequate for most fax packages and data communications, such as Quick Link II, America On-Line, Prodigy, Procomm Plus, WinFax, and so on. But, refer to the software package manual if you want or need to change a modem setting. Typical areas requiring changes are:

- DTR - normal operation (&D2)
- RTS/CTS - controls flow control with hardware (\Q3)
- Computer-to-Modem - message rate (\V1 or \V3)

NOTE: The use of XON and XOFF or software to control flow may be required for packages such as Faxtalk Plus. This is selected by entering AT&FQ1. If you select hardware flow control, your cable must have the RTS/CTS signal connections.

Commanding the Modem

The AT (ATtention) command protocol permits you to:

- Obtain information from the modem
- Configure the modem
- Establish data communications
- Test the modem and data communications system

When you turn the power on, the Quester III is in the AT command mode and accepts commands from the terminal. Each command string (except *A/*) must be preceded by the letters AT and followed by a carriage return or Enter. Multiple commands can be assembled together into a command string. The AT command buffer can hold up to 50 characters.

The *A/* command, which doesn't require the AT-prefix and (enter)-suffix, instructs the modem to repeat the last command string it received.

When the AT-prefix is entered, the modem detects the data rate and parity used by the terminal and begins operating at that same data rate and parity until changed.

New commands cannot be issued until a response to the previous command is received. In the case of no response, wait a minimum of 5 seconds before you enter another command.

Tables 3-1 through 3-6 describe each command. Tables are grouped as follows:

- The basic AT commands.
- The S-register commands.
- The extended AT& commands.
- The extended AT% commands.
- The extended AT\ commands.

NOTE: Any AT commands and S-Registers that are shown in Help Menu Screens but not listed in this manual are not applicable to this product.

AT command defaults are shown in bordered lines:

Default

Table 3-1 Basic AT Command Set

Command	Action
\$	AT command set Help Display help menu for the basic AT command set
A/	Repeat command Repeat last command
A	Answer call Answer incoming call
Dn	Dial The dial command, followed by one or more dial command modifiers, manually dials a phone number: ! or & Flash hook switch for 1/2 second , or < Pause before continuing. Time is in S-Register 8 (default: 2 seconds). :n Redial up to n times to achieve data mode ; Return to AT command mode @ Wait for quiet answer before continuing. Time is in S-Register 7 (default: 60 seconds). Ln Link to cell n if modem cannot achieve data mode \n Remote modem uses cell n for Security Callback when only SteadFast Security is enabled
	P Pulse (rotary) dialing
	R Reverse to answer mode. Must be the last character entered.
	Sn Dial number stored in cell n (n = 0-9)
	T Tone (DTMF) dialing
	W Wait for dial tone before continuing. Time is in S-Register 6 (default: 2 seconds).
	*,#,A,B,C,D,0,1,2,3,4,5,6,7,8,9 (DTMF digits) 0,1,2,3,4,5,6,7,8,9 (pulse digits)

Table 3-1 Basic AT Command Set (Cont.)

Command	Action
En	Local DTE echo
E0	Disable
E1	Enable
Hn	Hook switch
H0	Go on-hook (hang up modem)
H1	Go off-hook
In	Identification and checksum
I0	Display product code
I1	Display calculated checksum
I3	Display firmware revision level
I4	Display listing of modem feature information
I5	Display serial number
Mn	Speaker operation
M0	Speaker is always Off
M1	Speaker is On while dialing and handshaking, Off in data mode
M2	Speaker is always On
M3	Speaker is Off while dialing, On during handshaking and retraining
On	On-line
O0	Go on-line (enter data mode)
O1	Go on-line and retrain (at any speed except 300 bps)
O2	Go on-line and perform rate re-negotiation
P	Dialing type, Pulse (rotary) dial
Qn	Response mode
Q0	Enable
Q1	Disable (enable quiet mode)
Sn	S-Registers
\$\$	Display help menu for S-Registers
Sn?	Display contents of S-Register n
Sn=x	Set S-Register n to value x
T	Dialing type, Tone (DTMF) dial

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Table 3-1 Basic AT Command Set (Cont.)

Command	Action
Vn	Result code type
V0	Numeric result codes; connect message = VF line speed
V1	Alphanumeric (verbal) result codes; connect and protocol messages after link; connect message = DTE speed, except for ITU-T V.14 mode
V2	Same as V1 except connect message = VF speed
Xn	Call Progress Monitor (CPM)
X0	Basic results; disable CPM
X1	Extended results; disable CPM
X2	Extended results and detect dial tone only
X3	Extended results and detect busy only
X4	Extended results, full CPM
X5	Extended results, full CPM and detect ringback
Yn	Long space disconnect
Y0	Disable
Y1	Enable
Zn	Load user configuration profile
Zn	Recall (load) user-defined configuration profile n (n = 0 to 3). Storable S-Registers are stored with user-defined settings.

S-Registers/Commands

The S command allows you to view (Sn?) or change (Sn=x) the S-Registers. The S-Registers store values for functions that typically are rarely changed, such as timers or counters, and the ASCII values of control characters, such as Carriage Return. *Table 3-2* summarizes the S-Register set.

Table 3-2 S- Register Commands

Definition					
S-Reg.	Function	Decimal (default)	ASCII	Units	Storable
0	Automatic answer	1			Yes
1	Ring counter	0			No
2	Escape code character	43	+		No
3	Carriage return character	13	CR		No
4	Line feed character	10	LF		No
5	Backspace character	08	BS		No
6	Dial tone wait timer	02		seconds	Yes
7	Carrier wait timer; W and @ dial command modifier wait timer; ringback wait timer	60		seconds	Yes
8	Dial pause timer for , and < dial command modifiers	02		seconds	Yes

Table 3-2 S- Register Commands (Cont.)

Definition					
S-Reg.	Function	Decimal (default)	ASCII	Units	Storable
9	Carrier presence timer	06		0.1 second	Yes
10	Carrier loss timer	14		0.1 second	Yes
12	Escape code guard timer	50		0.02 second	No
18	Test mode timer	00		10 seconds	Yes
25	DTR delay timer	05		.01 seconds (&M0)	Yes
26	RTS-to-CTS delay timer	00		millisec- onds	Yes
38	Hang-up delay timer	20		seconds	Yes
42	Call failed-times to make busy	03			Yes
70	Retransmission counter	100			Yes
100	Adjustable transmit level	09			Yes

Table 3-3 Extended AT& Command Set

Command	Action
&\$	AT& command set help. Display help menu for the extended AT& command set
&An	Automatic fast forward/fallback mode
&A0	Disable
&A1	Enable
&Cn	Carrier operation
&C0	Force Carrier On
&C1	Carrier On after link established
&C2	Force Carrier On; toggle Carrier On disconnect
&C3	Real mode (follows modem energy detection)
&Dn	DTR On-to-Off transition (Data Terminal Ready)
&D0	Ignore (force DTR On)
&D1	Enter AT command mode
&D2	Go on-hook (hang up)
&D3	Same as &D2, but perform the Zn command on a loss of DTR greater than S-25 timer
&Fn	Load fixed configuration profile
&F0	Switched network, V.90 Auto asynchronous, ITU-T V.42 error correction, V.42 <i>bis</i> data compression
&F1	Switched network, V.34 Auto asynchronous, ITU-T V.42 error correction, V.42 <i>bis</i> data compression
&Gn	Maximum Line Connection Rate
&G5	Maximum DCE data rate is 4.8 kbps
&G6	Maximum DCE data rate is 7.2 kbps
&G7	Maximum DCE data rate is 9.6 kbps
&G8	Maximum DCE data rate is 12 kbps
&G9	Maximum DCE data rate is 14.4 kbps
&G10	Maximum DCE data rate is 16.8 kbps
&G11	Maximum DCE data rate is 19.2 kbps
&G12	Maximum DCE data rate is 21.6 kbps
&G13	Maximum DCE data rate is 24 kbps
&G14	Maximum DCE data rate is 26.8 kbps
&G15	Maximum DCE data rate is 28.8 kbps
&G16	Maximum DCE data rate is 31.2 kbps
&G17	Maximum DCE data rate is 33.6 kbps
NOTE: The &G command has no effect while the modem is operating in V.90 mode.	

Table 3-3 Extended AT& Command Set (Cont.)

Command	Action
&Hn	Switched network handshake mode
&H0	V.90 auto (56 kbps to 300 bps)
&H1	V.90 only (56 kbps to 28 kbps)
&H2	V.34 auto (33.6 kbps to 300 bps)
&H3	V.34 only (33.6 kbps to 2400 bps)
&H4	ITU-T V.32 <i>bis</i> automatic (14.4 kbps to 300 bps)
&H5	ITU-T V.32 <i>bis</i> only (14.4 kbps to 4800 bps)
&H6	ITU-T V.22 <i>bis</i> only (2400 bps to 1200 bps)
&H7	ITU-T V.22 only (1200 bps)
&H8	Bell 212 only (1200 bps)
&H9	Bell 103 only (300 bps)
&H10	ITU-T V.21 only (300 bps)
&Kn	Maximum line connection rate - V.90 only
&K0	Maximum DCE connection rate 28 kbps
&K1	Maximum DCE connection rate 29.333 kbps
&K2	Maximum DCE connection rate 30.666 kbps
&K3	Maximum DCE connection rate 32 kbps
&K4	Maximum DCE connection rate 33.333 kbps
&K5	Maximum DCE connection rate 34.666 kbps
&K6	Maximum DCE connection rate 36 kbps
&K7	Maximum DCE connection rate 37.333 kbps
&K8	Maximum DCE connection rate 38.666 kbps
&K9	Maximum DCE connection rate 40 kbps
&K10	Maximum DCE connection rate 41.333 kbps
&K11	Maximum DCE connection rate 42.666 kbps
&K12	Maximum DCE connection rate 44 kbps
&K13	Maximum DCE connection rate 45.333 kbps
&K14	Maximum DCE connection rate 46.666 kbps
&K15	Maximum DCE connection rate 48 kbps
&K16	Maximum DCE connection rate 49.333 kbps
&K17	Maximum DCE connection rate 50.666 kbps

Table 3-3 Extended AT& Command Set (Cont.)

Command	Action
&K18	Maximum DCE connection rate 52 kbps
&K19	Maximum DCE connection rate 53.333 kbps
&K20	Maximum DCE connection rate 54.666 kbps
&K21	Maximum DCE connection rate 56 kbps
&L0	Switched network operation
&M0	Asynchronous data mode
&Rn	CTS operation (Clear to Send)
&R0	Asynchronous mode:On AT command mode:Force CTS On
&R1	Asynchronous mode:Real AT command mode:Force CTS On
&R2	Asynchronous mode:Real AT command mode:Real
&R3	Asynchronous mode:Force CTS On AT command mode:Force CTS On
NOTE: Flow control (\Qn) options override the &Rn settings for CTS in data mode.	
&Sn	DSR operation (Data Set Ready)
&S0	Force DSR On; toggle Off on disconnect
&S1	Normal DSR operation
&S2	DSR follows carrier detect
&S3	Force DSR On
&Tn	Test mode
&T0	Cancel (terminate) test mode (after you have done +++ and wait for OK)
&T1	Initiate ITU-T V.54 Loop 3 test (ANALOOOP) - V.34 mode
&T8	Initiate ITU-T V.54 Loop 3 with self-test (ANALOOOP Self-Test) - V.34 mode
&T9	End-to-End Self-Test

Table 3-3 Extended AT& Command Set (Cont.)

Command	Action
&Un	Trellis
&U0	Enabled
&U1	Disable
&V	View stored phone numbers. Display all 10 stored phone numbers, in sequence
&Wn	Save settings as a user configuration profile Save option settings as user configuration profile in non-volatile RAM (n = 0 to 3)
&Yn &Yn	Power-up user configuration profile Load user configuration profile at power up (n = 0 to 3)
&Zn=nnn	Store phone number nnn (up to 42 digits, including dial command modifiers) in cell n (n = 0 to 9)

Table 3-4 Extended AT% Command Set

Command	Action
%%\$	AT% command set help. Display help menu for the extended AT% command set
%An	Auto-reliable fallback character Set auto-reliable fallback character to n (n = ASCII 0 to 127) - <i>default = 013</i>
%Bn	Make busy
%B0	Disable
%B1	Enable on loss of DTR
%B2	Enable in ITU-T V.54 Loop 3 test (ANALOOP) - V.34 mode
%B3	Enable in ITU-T V.54 Loop 3 test (ANALOOP) - V.34 mode, or on loss of RTS or DTR
%B4	Enable on loss of RTS

Table 3-4 Extended AT% Command Set (Cont.)

Command	Action
%Cn	Data compression
%C0	Disable
%C1	Enable in transmit and receive paths
%C2	Enable in transmit path only in V.42 <i>bis</i>
%C3	Enable in receive path only in V.42 <i>bis</i>
%Dn	DSR operation in test mode
%D0	Force DSR On during ITU-T V.54 Loop 3 test (ANALOOP)
%D1	Force DSR Off during this test
%Kn	Character abort
%K0	2-second delay to character abort
%K1	Disable
%On	Answer mode
%O0	Answer mode if ringing
%O1	Force to answer mode
%O2	Automatic answer in originate mode
%Pn=xxx	Security password for cell n (n = 0-9); SteadFast Security, cell 0 only; on-line security, any cell. Password (xxx) can be 1 to 10 characters, alphanumeric and/or punctuation (comma is not allowed).
%Pn	Disable or clear the password in cell n
%Qn	Retrain on poor signal quality
%Q0	Disable
%Q1	Attempt up to 3 consecutive retrains; disconnect if not successful
%Q2	Retrain until signal quality is good

Table 3-4 Extended AT% Command Set (Cont.)

Command	Action
%Rn	Call Progress Monitor (CPM) message response speed
%R0	Auto baud
%R1	Send at last connect speed
%R2	300 bps
%R3	1200 bps
%R4	2400 bps
%R5	4800 bps
%R6	7200 bps
%R7	9600 bps
%R8	12.0 kbps
%R9	14.4 kbps
%R10	16.8 kbps
%R11	19.2 kbps
%R12	21.6 kbps
%R13	24.0 kbps
%R14	26.4 kbps
%R15	28.8 kbps
%R16	31.2 kbps
%R17	33.6 kbps
%R18	38.4 kbps
%R19	57.6 kbps
%R20	76.8 kbps
%R21	115.2 kbps
%R22	128.0 kbps
%R30	230.4 kbps
%Sn	Password Operation
%S0	All password security disabled
%S1	SteadFast Security password using cell 0 enabled
%S4	SteadFast Security password with mandatory callback

Table 3-4 Extended AT% Command Set (Cont.)

Command	Action
%Tn	Idle Switched Network timer in <i>n</i> minutes
%Vn	Command format
%V0	AT command set
%Zn	DTR dialing
%Z0	Ignore
%Z1=x	Dial cell <i>x</i> on DTR active transition
%Z2	Go off-hook and attempt to handshake on DTR active transition
%Z3=x	Dial cell <i>x</i> on DTR active transition; while DTR remains On redial if needed

Table 3-5 Extended AT\ Command Set

Command	Action
\\$	AT\ command set help. Display help menu for the extended AT\ command set
\An	Overspeed correction
\A0	1.25% (nominal) asynchronous overspeed correction
\A1	2.5% (extended) overspeed correction
\Bn	Character length (data bits/parity/stop bits)
\B0	6N1
\B1	7N1
\B2	7P1 (\Pn command sets parity type)
\B3	8N1
\B4	7P2 (\Pn command sets parity type)
\B5	8P1 (\Pn command sets parity type)
\Cn	Fallback selection and pre-link data buffer
\C0	Timeout and fallback; speed buffer; no data buffer
\C1	Timeout and fallback; speed buffer; buffer receive data
\C2	Auto-reliable; fallback with fallback character speed buffer; no receive data buffer
\C3	Timeout and fallback; ITU-T V.14; buffer receive data
\C4	Timeout or fallback with fallback character; ITU-T V.14; no data buffer

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Table 3-5 Extended AT Command Set (Cont.)

Command	Action
\Gn	Modem-to-modem flow control (<i>Only in Speed Buffer Mode</i>)
\G0	Disable
\G1	Enable XON/XOFF in transmit and receive paths
\G2	Enable in transmit path only
\G3	Enable in transmit and receive paths, with pass-through
\Kn	Break character handling
\K0	Expedite break; destroy buffers
\K1	Expedite break; save buffers
\K2	Timed break; save buffers
\K3	Ignore break
\K4	Timed break until no break character; save buffers
\K5	Timed break until no break character; save buffers
\Nn	Asynchronous protocol
\N0	Wire mode (<i>Only in Speed Buffer Mode</i>)
\N1	Direct ITU-T V.14 asynchronous mode
\N3	V.42 auto-reliable
\N4	V.42 (LAPM) reliable mode (or drop call)
\N5	V.42 (LAPM) reliable mode (or drop call)
\Pn	Parity type
\P0	Even
\P1	Space
\P2	Odd
\P3	Mark
\P4	Automatic (from last AT command)

Table 3-5 Extended AT Command Set (Cont.)

Command	Action
\Qn	Modem-to-DTE flow control
\Q0	Disable in both directions
\Q1	Use XON/XOFF in both directions
\Q2	Use CTS
\Q3	Use RTS/CTS
\Q4	Use XON/XOFF from modem to DTE only
\Rn	Asymmetrical mode
\R0	Disable
\R1	Enable
\Tn	DTE speed
\T0	Autobaud; %R sets CPM message response speed
\T1	Last AT speed
\T2	300 bps
\T3	1200 bps
\T4	2400 bps
\T5	4800 bps
\T6	7200 bps
\T7	9600 bps
\T8	12.0 kbps
\T9	14.4 kbps
\T10	16.8 kbps
\T11	19.2 kbps
\T12	21.6 kbps
\T13	24.0 kbps
\T14	26.4 kbps
\T15	28.8 kbps
\T16	31.2 kbps
\T17	33.6 kbps
\T18	38.4 kbps
\T19	57.6 kbps
\T20	76.8 kbps

Table 3-5 Extended AT Command Set (Cont.)

Command	Action
\T21	115.2 kbps
\T22	128.0 kbps
\T30	230.4 kbps
\Vn	Connect message type
\V0	Connect message reports VF rate upon data mode, link message after link negotiation (GDC format)
\V1	Connect and protocol message sent after link negotiation, connect reported as DTE rate
\V2	Connect and protocol message after link negotiation and Microcom compatible, connect reported as VF rate
\V3	Connect message only after protocol negotiation, connect reported as DTE rate
\V4	Connect message reports asymmetrical connect speeds.

Table 3-6 Extended AT: Command Set

Command	Action
:P0	Permissive transmit level

Password Security

While operating in V.34 or V.32 mode the GDC Quester III V.90 modem can provide configurable **SteadFast Security** in which the answering modem terminates the call if it does not receive a required password. The modem can be configured for one of two responses when it receives a correct password: **pass-thru**, meaning that it connects the incoming call to its DTE; or **callback**, meaning that it disconnects the incoming call and then places a new call back to the modem that initiated the connection.

The %Sn command selects password functions and permits you to enable or disable SteadFast password security.

SteadFast Security Password

In **SteadFast Security** the modem that initiates the call sends the password as part of its handshake sequence. In order to use a **SteadFast Security** password, both modems must be GDC modems optioned for **SteadFast Security (%S1)**. Both modems must have the same password saved in their password memory cell (**%P=XXX**). The remote user does not have to type in any additional passwords.

When the **SteadFast Security** password is enabled and pass-thru operation is selected, the password procedure is completed during the handshake and no further user intervention is required.

A remote user initiating a call can invoke the **SteadFast Security** callback feature by including the AT dial command modifier **\n** (where **n** represents a phone number cell in the answering modem). The dial command modifier, when combined with the valid **SteadFast Security** password, causes the modem to disconnect the incoming call and dial the number from the specified memory cell. The callback phone number must be saved in a phone number cell of the answering modem by means of the **&Zn=nnn** command. Up to 10 phone numbers can be stored in cells 0 – 9 using the **&Z** command.

For example, to call a modem at 555-1212 and have it call back the phone number stored in cell 1, enter:

```
ADT5551212\1
```

After handshaking and a short delay, the remote modem terminates the call, and places a new call, using the phone number stored in cell 1, back to the modem that initiated the process. If the dial command modifier had not been included, the **SteadFast Security** password would have resulted in a pass-thru connection.

The central site, or answering, modem can be configured (using the **%S4** command) for **mandatory callback with SteadFast Security password**. In this arrangement the calling modem must be optioned for **%S1**. A callback phone number must be saved in the answering modem by means of the **&Zn=nnn** command. When using **SteadFast Security** password with mandatory callback, the caller must include a valid callback cell number with the phone number that is dialed to

initiate the connection (Example ATDT5551212\1). If the callback cell number is not supplied with the phone number, the answering modem will disconnect the call.

NOTE: To use SteadFast Security password, the handshake modes of the modems must be V.34 (&H1), V.32 bis (&H3) or V.32 (&H5).

NOTE: Telephone numbers stored for security callback should always include the :n (retry) modifier to compensate for any delay in receiving the dial tone from the Central Office after the initial connection is terminated. Configure the modem to make at least three additional attempts to dial the number. If calls abort during handshake, try disabling character abort feature (%K1).

Table 3-7 SteadFast Password Security

Security Feature	Originate Modem Configuration	Answer Modem Configuration
Passwords disabled	%S0 ATDT (phone number)	%S0
SteadFast Security (Pass-thru)	%S1 %P0=(SF password) ATDT(phone number)	%S1 %P0=(SF password)
SteadFast Security - callback w/ number in cell #1	%S1 %P0=(SF password) ATDT (phone number)\1	%S1 %P0=(SF password) &Z1=(C/B phone number)
SteadFast Security w/ mandatory callback w/ number in cell #1	%S1 %P0=(SF password) ATDT (phone number)\1	%S4 %P0=(SF password) &Z1=(C/B phone number)
<p><i>Notes: Factory default command &F does not affect the %P, %F, or &Z commands. Use of SteadFast Security requires that both modems be GDC V.90 modems configured to handshake at V.34, V.32 bis, or V.32. Passwords can be any string of up to ten alphanumeric and punctuation characters (except a comma ","). The SF (SteadFast) password used during the handshake sequence is stored in the %P memory cell and must be the same on both modems. Callback numbers for SteadFast Security and on-line password security can be stored in memory cells &Z0 through &Z9.</i></p>		

Connect Message Type

\V0 options the modem to send the standard GDC Connect message upon reaching data mode plus V.42 messages after the link negotiation. The connect message displays VF line speed:

Table 3-8 \V0 Connect Messages

Numeric	Meaning	Verbal Response
0	Command was successful	Ok
4	Command failed	Error
1	Link established	Connect
2	Incoming ring detected	Ring
23	Ringback detected	Ringling
24	Exchange cannot dial number	Un-obtainable number
3	Link dropped	No carrier
6	Dial tone not present	No dialtone
8	Remote not answering	No answer
7	Line busy	Busy
1	Link establish at 300	Connect
5	Link establish at 1200	Connect 1200
10	Link establish at 2400	Connect 2400
11	Link establish at 4800	Connect 4800
15	Link establish at 7200	Connect 7200
12	Link establish at 9600	Connect 9600
16	Link establish at 12000	Connect 12000
17	Link establish at 14400	Connect 14400
18	Link establish at 16800	Connect 16800
14	Link establish at 19200	Connect 19200
19	Link establish at 21600	Connect 21600
20	Link establish at 24000	Connect 24000
21	Link establish at 26400	Connect 26400
22	Link establish at 28800	Connect 28800
23	Link establish at 31200	Connect 31200
24	Link establish at 33600	Connect 33600

Table 3-8 \V0 Connect Messages (Continued)

Numeric	Meaning	Verbal Response
63	Link establish at 28000	Connect 28000
64	Link establish at 29333	Connect 29333
65	Link establish at 30666	Connect 30666
60	Link establish at 32000	Connect 32000
66	Link establish at 33333	Connect 33333
67	Link establish at 34666	Connect 34666
68	Link establish at 36000	Connect 36000
69	Link establish at 37333	Connect 37333
90	Link establish at 38666	Connect 38666
91	Link establish at 40000	Connect 40000
92	Link establish at 41333	Connect 41333
93	Link establish at 42666	Connect 42666
94	Link establish at 44000	Connect 42000
95	Link establish at 45333	Connect 45333
96	Link establish at 46666	Connect 46666
61	Link establish at 48000	Connect 48000
97	Link establish at 49333	Connect 49333
98	Link establish at 50666	Connect 50666
99	Link establish at 52000	Connect 52000
100	Link establish at 53333	Connect 53333
101	Link establish at 54666	Connect 54666
52	Link establish at 56000	Connect 56000

With \V0 and \V1, the following connect messages are sent when link negotiation is complete:

Table 3-9 \V0 and \V1 Connect Messages

Numeric	Meaning	Verbal Response
70	No Protocol	Protocol:none
77	V.42 Protocol	Protocol:v.42
79	V.42 Bis Protocol	Protocol:v.42bis

\V1 options the modem to delay sending the Connect message until an error corrected link has been established. The Connect message indicates DTE speed unless a V.14 connection was established, in which case it will indicate the VF speed:

Table 3-10 \V1 Connect Messages

Numeric	Meaning	Verbal Response
1	DTE link at 300	Connect
5	DTE link at 1200	Connect 1200
10	DTE link at 2400	Connect 2400
11	DTE link at 4800	Connect 4800
15	DTE link at 7200	Connect 7200
12	DTE link at 9600	Connect 9600
16	DTE link at 12000	Connect 12000
17	DTE link at 14400	Connect 14400
18	DTE link at 16800	Connect 16800
14	DTE link at 19200	Connect 19200
19	DTE link at 21600	Connect 21600
20	DTE link at 24000	Connect 24000
21	DTE link at 26400	Connect 26400
22	DTE link at 28800	Connect 28800
23	DTE link at 31200	Connect 31200
24	DTE link at 33600	Connect 33600
25	DTE link at 38400	Connect 38400
26	DTE link at 57600	Connect 57600
27	DTE link at 76800	Connect 76800
28	DTE link at 115200	Connect 115200
29	DTE link at 128000	Connect 128000
30	DTE Link at 230400	Connect 230400

\V2 is similar to the \V1 function except that /REL is included at the end of the message when a V.42 error corrected link has been established. The message numbers 0 through 10 are the same as for \V0:

Table 3-11 \V2 Connect Messages

Numeric	Meaning	Verbal Response
30	Reliable DTE link at 300	Connect Rel
31	Reliable DTE link at 1200	Connect 1200/Rel
32	Reliable DTE link at 2400	Connect 2400/Rel
33	Reliable DTE link at 4800	Connect 4800/Rel
34	Reliable DTE link at 7200	Connect 7200/Rel
35	Reliable DTE link at 9600	Connect 9600/Rel
36	Reliable DTE link at 12000	Connect 1200/Rel
37	Reliable DTE link at 14400	Connect 14400/Rel
38	Reliable DTE link at 16800	Connect 16800/Rel
39	Reliable DTE link at 19200	Connect 19200/Rel
40	Reliable DTE link at 21600	Connect 21600/Rel
41	Reliable DTE link at 24000	Connect 24000/Rel
42	Reliable DTE link at 26400	Connect 26400/Rel
43	Reliable DTE link at 28800	Connect 28800/Rel
44	Reliable DTE link at 31200	Connect 31200/Rel
45	Reliable DTE link at 33600	Connect 33600/Rel
46	Reliable DTE link at 38400	Connect 38400/Rel
47	Reliable DTE link at 57600	Connect 57600/Rel
48	Reliable DTE link at 76800	Connect 76800/Rel
49	Reliable DTE link at 115200	Connect 115200/Rel
50	Reliable DTE link at 128000	Connect 128000/Rel



4 Troubleshooting

Updated information and files can be obtained by accessing GDC at [http:// www.gdc.com](http://www.gdc.com)

We recommend the following procedure to troubleshoot your modem:

- Set the modem to the factory configuration (AT&F).
- Make sure that the modem is completely installed and computer and modem power is On.
- Check that the cables are not loose or defective and are hooked up correctly.
- Use the Troubleshooting Guide that appears below.

Difficulty	Check-Out	Solve
Commands have no effect on the modem.	Make sure that the COM port designated by the communications software to the modem is correct. Verify that as AT commands are typed, the LEDs blink. Verify that the data rate for the communications software package is set to a computer-to-modem supported auto baud speed.	Set proper COM port in software communications. Correct cabling or modem power. Set supported rate in software package. If you are experiencing problems, set speed to 9600 bps until problem is defined or resolved.
Typed characters produce a double echo when the modem is operating.	Check setting of the echo on the modem. Determine the echo or duplex setting of the communications software.	Turn one of the echo settings Off, if both are On.

Difficulty	Check-Out	Solve
No answer from modem.	Verify the configuration of the modems and DTR setting.	See that the modem is set to auto answer (S0=1). If the TR light is not On, make sure &D0 is set (use AT&\$command).
Modem doesn't dial.	Make sure that there is a dial tone. And if you use DTR dialing (AT%Z1=n), check out the phone number at the location where it is stored (&V command).	Phone cabling or storing a number in Cell n. Set DTR option AT&D0.
Modem doesn't connect.	Check the handshake option; or the mode for error correction and data compression	Set AT&H0, or ATN3, or both
Software communications package shows on-line connection status before calling or answering.	Check Carrier On option	Set Carrier=normal (AT&C1).
Modem connects but cannot pass data.	Verify the computer-to-modem speed of the communications package. Observe the control method of the computer flow control and that the flow is identical to the setting of the modem, such as XON-XOFF or RTS/CTS (recommended). Check for modem-to-modem flow control.	Set the flow control of the modem to RTS/CTS (AT\Q3) if you are using a communications software package that is supporting RTS/CTS flow control (recommended). Or if XON/OFF is used, set the modem for (AT\Q1). Or if no flow control is used, set the modem flow control Off (AT\Q0).

Difficulty	Check-Out	Solve
Premature modem disconnection.	See that the error correction is supported by the remote modem.	Set the modem for normal mode (ATN) and retry the call, if the remote modem is not supporting error correction.
Garbled or lost data	Check the control settings of the modem flow.	Set the flow control of the modem to RTS/CTS (ATQ3) if you are using a communications software package that is supporting RTS/CTS flow control. Or if XON/OFF is used, set the modem for (ATQ1). Or if no flow control is used, set the modem flow control OFF (ATQ0).
Data stops passing.	Check to see if the modem is set for XON\XOFF flow control (ATS). If the modem is set for XON\XOFF flow control (\Q1), set to \Q3.	Set the software and modem for hardware flow control (ATQ3); or put flow=Off (ATQ0).
Modem does not disconnect when DTR drops or when the communications software package calls for a disconnect command (+++ATH).	Verify the delay between ATH command and issue the escape sequence (+++). Software delay must be greater than the S Register 12 value (default is 1 second). Verify that DTR is not forced On (&D0).	Make certain that the escape sequence (+++) is complying with the guard time requirements of the modem. Refer to <i>Table 3-2, Register S12</i> . Set (AT&D2).

Difficulty	Check-Out	Solve
A file cannot be transferred by modem or is aborting during the transfer.	<p>Check the flow control settings of the modem (ATX\$).</p> <p>Verify that the computer uses a high speed COM port with a 16550 a UART (at high DTE speeds). Run MSD in DOS mode.</p>	<p>Set the flow control on the computer and the modem to RTS/CTS (\Q3).</p> <p>Reduce the terminal speed until you get a speed that is slow enough, if you are not using a 16550 UART.</p> <p>Install a high speed serial port with a 16550 UART.</p>
File is taking too long to transfer.	Determine connect speed (use \V0).	Force a lower connect speed using the &Gnn command.
Unexpected call termination.	Review termination table below.	Correct setting/issue.

Call-Termination

Cause of Termination	Explanation
Disconnect during the handshake.	S7 timed out - use a larger number security failure - check your password. character abort - disable by selecting %K1
Operator or software disconnect.	Command to disconnect (+++ATH) was given or TR was turned Off.
Carrier loss during transmissions - no carrier message.	S Register 10 timed out or remote modem may have dropped the call.
Receive long space disconnect	Only operates in V.22 bis mode. Remote operator terminated the call.
Clear down OK message	Disconnect method found in V.32 bis and V.34 mode on a normal disconnect sequence.
Test mode entered	Analog test modes force call-termination.
Modem is turned Off.	Loss of power.



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